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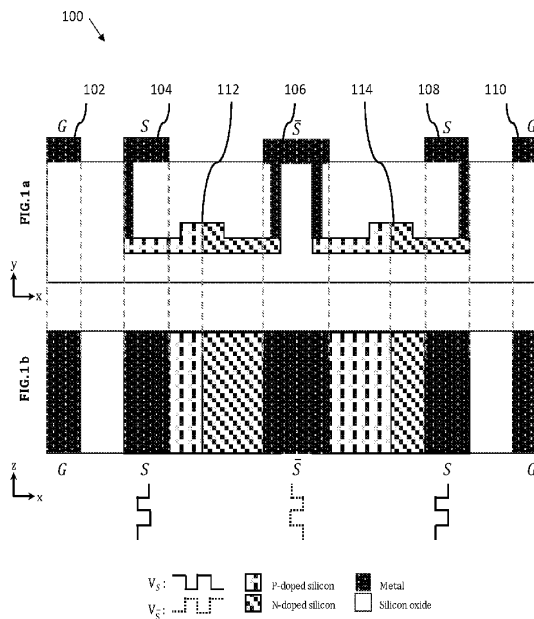
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(54) Title: **BALANCED DIFFERENTIAL MODULATION SCHEMES FOR SILICON PHOTONIC MODULATORS**



(57) **Abstract:** The invention relates to photonic differential modulators and more particularly different electrode configurations for differential driving schemes for reducing the driving voltage for a given phase shift and device footprint. The embodiments comprise of two reverse-biased p-n junctions driven in a push-pull configuration from signal (S) to signal bar (S-bar). The first embodiment shares the S-bar electrode between two p-n junctions to reduce the device footprint at the expense of difficult impedance matching. The second embodiment does not contain any shared electrode and instead adds additional electrodes for the sake of easier impedance matching. Specifically, the second embodiment decouples the two p-n junctions along with their respective transmission lines for ease of impedance matching. The third embodiment shares both the S and S-bar electrodes through an interleaved electrode design to reduce the device footprint, and makes impedance matching easier by slow-wave effect on the transmission lines.

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